

# Rhodora

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## OLD-TIME CONNECTICUT BOTANISTS AND THEIR HERBARIA,—II.

C. A. WEATHERBY.

JOSEPH BARRATT—Biographical information about Barratt is not altogether easy to come by. He died an old man, poor and with no near relatives within reach. His effects were mostly handed over to his landlord to satisfy a debt and were sold or destroyed as they appeared to have value or not. All that remains of his personal papers are a few odd slips on which he was accustomed to jot down accounts of any events which seemed to him of especial interest, and a small note-book into which he copied some of these slips, together with a table of dates. From these, from a series of his letters to Dr. Torrey during the years 1827 to 1846, now preserved at the New York Botanical Garden, from references to him in botanical works of his contemporaries and from the local newspapers of his time, it is possible to patch together some outline of his life and to gain some notion of what manner of man he was.

The figure which results has about it a certain air of failure. He had, one feels, an opportunity. He was a man of real learning, good natural powers of observation and large enthusiasm and industry, and had the impulse and desire for original work. He gathered an excellent library, and was the acquaintance or correspondent of some of the best botanists of his time. He lived in a region of considerable botanical interest, then practically unexplored. He ought, it seems, to have been, if not a Muhlenberg or a Torrey, at least another Darlington or Bigelow. In geology, his chance was as good. Yet he is remembered today by the older residents of Middletown as a rather amusing eccentric who was wont to go clambering about the



Portland quarries with a pencil hung about his neck on a string and his hands full of great sheets of brown paper, on which he made strange drawings of marks in the stone. His memorials are an author-citation or two in current manuals, an occasional reference, not disrespectful, in works on special groups, a half-dozen little-known pamphlets—and a place in John Fiske's essay on "Some cranks and their foibles." His herbarium is probably his most solid and valuable achievement.

Various elements may have contributed to the meagerness of his accomplishment. One was his multiplicity of interests. By profession a physician and teacher, plants, insects and birds, chemistry, mineralogy and meteorology, local history, Indian antiquities and language, and finally geology, engaged his interest by turns and detracted one from another. Lack of money for publication and resultant discouragement may have had their effect. But, looking through what remains of his work, one seems to find a deeper reason—a certain inconclusiveness, a lack of selective and co-ordinating faculty. When he is not supported by the definite structure of a systematic botanical arrangement his articles have a way of trailing off vaguely at the end. He does not finish. That is the usual fate of a mind such as we may suppose his to have been—keen, but disorganized, better at observation than at correlating and interpreting its results.

Joseph Barratt was born at Little Hallam, Derbyshire, England, January 7, 1796.<sup>1</sup> His immediate family seems to have been large, for he mentions four brothers and a sister, and of ancient descent, since he records finding "particulars respecting his ancestors" in the Domesday Book. In 1810, he began the study of medicine at London and in 1816 was practising at Leicester. In 1819, for what reason he does not state, he left England for the United States, sailing from Liverpool on the ship *Remittance*, Capt. Silas Holmes.

The voyage to New York lasted seven weeks. Soon after his arrival, he went to Philipstown, N. Y., where he settled down to the practice of "physic" and the botanical exploration of the surrounding country. To the usefulness of the latter work Torrey pays special tribute in the preface to his *Flora of New York*; and he might

<sup>1</sup> This is the date given by Barratt himself in his fragmentary diary. The inscription on his tombstone gives 1797, and the printer of the *Catalogue of Connecticut Plants* has generously made it 1707.

have done as much for the former, since Barratt in his capacity as a physician brought him safely through a fever. Barratt had made his acquaintance in 1822 and for more than twenty years remained his correspondent and occasional visitor.

In July, 1824, Barratt went to Norwich, Vermont, to teach in the Academy, or, as he calls it, the "Scientific Institution" there. He promptly took advantage of his comparative nearness to the White Mountains to visit them and ascend Mt. Washington, September 18, 1824.<sup>1</sup> In September, 1825, he returned to Philipstown and resumed practice. That autumn he, in company with Torrey, visited Schweinitz at Bethlehem and, he records, first heard "that admired hymn, 'On Greenland's Icy Mountains.'"<sup>2</sup>

In May, 1826, Barratt became "professor of botany, chemistry and mineralogy in Capt. Alden Partridge's Military Academy" at Middletown, Connecticut. There, with occasional brief absences—one a visit to Niagara—he remained resident for the rest of his long life. At first he devoted himself wholly to teaching, but when the academy closed in 1828, again turned to medicine. For the next twenty-five years we get occasional glimpses of him as a successful physician, a well-liked man, a guest "eagerly sought for" and an active citizen,<sup>3</sup> interested in the history and such of the doings of the place as touched his tastes and abilities. He relates with some pride, that he was among the first to be presented to Daniel Webster when that great man visited Middletown. We find him proposing a plan for re-stocking the Connecticut River with salmon; serving on a commission to investigate a boiler explosion; one of the jury of awards on gardens at the local agricultural society's annual fair; addressing the Farmers' Club on fertilizers, grasses, the cultivation of gooseberries and the like subjects; and inducing two of its members to try raising *Lolium perenne* as a forage grass.<sup>4</sup> He was a vigorous advocate of cheap postage. Toward 1845 he became interested in

<sup>1</sup> One incident of this journey Barratt related with gusto to Torrey in after years. "That coarse, long-legged fellow . . . Crawford," he wrote, "laughed at the idea of my enduring fatigue, but I gave him such a walk over the mountains, taking him about thirty miles in one day, that he will not soon forget. I tired him out and had to send a horse for him."

<sup>2</sup> The preposition suggests that the enunciation of singers, in those days as now, was not always perfect.

<sup>3</sup> He was naturalized in 1830 and made a voter in the following year.

<sup>4</sup> The experiment seems not to have been a great success; at least, ray grass has not displaced timothy in the hay-fields about Middletown.



the local history and the customs, and especially the language of the Indians. Two items on the brief list of his publications are devoted to this subject. Doubtless this interest led to his appointment as one of the committee in charge of the celebration of the bi-centennial anniversary of the settlement of Middletown in 1850.

But his scientific interests seem never to have been quite forgotten. In 1835 we hear of him as in charge of a class in botany at Wesleyan University, then recently started, and as one of the founders and the president of a college scientific society. In 1836 he wanted to give up practice and go as naturalist with the Wilkes exploring expedition and applied for the place in competition with Asa Gray. He kept meteorological records, investigated the dates of late and early frosts and the length of the growing season, and the effect of rain-fall at the flowering time of fruit trees on the subsequent crop. He made observations on the spring floods of the Connecticut River and suggested a method of measuring their height very similar to that now in use. He studied the rocks of the region and planned to compile a catalogue of minerals occurring in them. The local papers contain letters from him on all these subjects—as frequent, one suspects, as the editors would allow.

His final, and fatal, interest was in geology. He had the misfortune—for him—to live at the edge of the triassic sandstone of the Connecticut Valley and near quarries where, in the course of their work, tracks of animals and other fossils, in which these rocks are rich, were often uncovered. These things fired his imagination—over-stimulated it, indeed. He began to see in them what no one else could discern—vestiges of warm-blooded animals, ostriches kangaroos<sup>1</sup> and the like; the impression of a hairy belly where some quadruped had crouched; finally the foot-prints of man. It was a special kind of man with four toes only and Barratt christened him *Homo tetradactylos*. With little evidence but his own surmises to go upon, he concluded that these rocks were not Triassic but Eocene and that in that age, some millions of years earlier than other geologists would allow, man and warm-blooded animals had appeared together. From the seemingly insignificant circumstance that their tracks were contiguous, he argued that *Homo tetradactylos* had domesticated the monsters of his time and used them for his convenience.

<sup>1</sup> He remarks that large birds and kangaroos lived together then as now in Australia.

So important a period, he felt, should have a special name and he coined for it the resounding title of "Kalorimazoic." In his last publication, a little pamphlet issued in 1874, Barratt sets forth his conclusions and so anxious is he that his newly delimited age and its name shall have due emphasis that, whenever that name occurs in his discourse, he prints it in large capitals and on a line by itself.

It is said that as early as 1845 Barratt exhibited drawings of putative human foot-prints at a geologists' meeting at New Haven. As his theories developed and grew wilder, ridicule was the natural result. There was one grotesque incident when, refused a hearing at a convention of geologists, he somehow, at night, got into the hall where they were to meet and covered the face of the gallery with an impromptu frieze of his drawings, which were to greet the assemblage in the morning, mutely convince the sceptical and confound him whom he esteemed his chief rival, Edward Hitchcock.

Two brief quotations may serve to give some notion of the man in his later years. His geological interests, says the writer of an unsigned newspaper obituary, "became his one object in life. His business was neglected and his many friends, and his room became one grand museum, whose walls and tables were covered with drawings, specimens and relics of all kinds. Twenty years ago he interested and amused by turns any group that he could get to listen to him." John Fiske describes him as a courtly and lovable "gentleman of the old stripe." He lived, at this time, in rooms over a drug store in an old building which still stands on Main Street in Middletown. In them, says Fiske, there was such confusion as "has not been seen since this fair world weltered in primeval chaos—specimens of all kinds, chemical apparatus, books and papers sprawling and tumbled all about. . . . Never did he clear a chair for me without an apology, saying that he only awaited a leisure day to put all things in strictest order. . . . That day never came."

Toward the end, Barratt's mind gave way; he died in the hospital for the insane just outside of Middletown, January 25, 1882. He never married. He is buried in Indian Hill Cemetery in Middletown and over his grave has been placed an irregular block of his beloved Portland sandstone containing two bits of fossil tree-trunk—symbolic at once of his botanical and geological interests.

*(To be continued.)*



## AN UNUSUAL FORM OF HABENARIA CLAVELLATA

EDWARD A. EAMES.

(Plate 131.)

To those of us having an acquaintance with some particular plant family, it is always pleasing to detect a strange feature or some unusual development in a member of that group. Any departure from type, in color, form or arrangement of the parts, is always interesting and receives close attention. I believe such abnormalities as these are caused by some temporary, accidental influence. They seldom occur in numbers, among plants in their natural environment, and usually they are quickly submerged and lost in succeeding generations.

However, there are departures from type which occasionally prove to be of more importance. If the new character or feature is persistent and becomes established, and the plant proves capable of reproducing this new character, a true variety has been established.

Having devoted considerable attention to the orchid family for a number of years, it is but natural that in the course of many days in the field in search of my favorite plants, I have happened upon a number of cases of temporary variation from normal. I have seen *Arethusa bulbosa* with its blossom pure snowy white instead of the usual deep magenta color; I have seen *Microstylis monophylla* with two apparently normal leaves instead of the single leaf from which it receives its specific character and I have seen *Listera australis* in one colony where its colorless lip was almost transparent, and in another colony where the rich mahogany-red color of the lip made the plants comparatively conspicuous. Such abnormalities, of which the foregoing are but examples, are well known among botanists of course, and are mentioned here only to illustrate the *kind* of variation which seems to involve no fundamental change in the plant. They are analogous perhaps, to cases of albinism, or cases of more than the usual number of fingers, in human beings.

But what can be said about a variation from normal, in a certain orchid which I came upon early last August, near Damariscotta, Maine, in which the abnormality took the form of *a new shape and structure of one of the parts of the blossom, and was found to be typical of a considerable portion of all the plants throughout a large area?* In this



district I found a tract which was roughly a half a mile long and a quarter of a mile wide, containing small scattered colonies of *Habenaria clavellata* in full bloom. A careful examination of more than one hundred plants throughout this area, showed that the blossoms of at least one fourth of them (probably more) had the end of their spurs divided into two distinct divergent lobes. The accompanying plate (131) shows this peculiarity so clearly that no further description is needed. The three specimens, which by no means represent extreme cases, are shown approximately full size.

This departure from the usual form of spur in this orchid is so unusual, if not actually unique, and so different in *kind* from the examples mentioned above, that it seems to me to be not only of considerable interest in itself, but worthy of record. Indeed, from the abundance of such plants at this station, I am inclined to wonder if this peculiarity may not be expected to continue to appear in their succeeding generations. If this should prove to be the case, it may then be reasonable to consider whether they do not constitute a true variety.

In this connection, it seems to me to be well worth while to learn whether this division of the spur-tip is persistent or not in this locality, and to this end I would be very glad to hear from some local botanist who would be willing to report on these plants next summer.

BUFFALO, NEW YORK.

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## THE SOIL REACTIONS OF *SPIRANTHES CERNUA* AND ITS RELATIVES.

EDGAR T. WHERRY.

IN "Observations on the soil acidity of Ericaceae and associated plants in the Middle Atlantic States",<sup>1</sup> the range of *Spiranthes cernua* (*Ibidium cernuum*) was given as from specific acidity 300 to 3, with optimum at 30. This is an unusually wide range for a single species (or variety), and it was suspected that the plants tested might not all be the same, although no opportunity for studying them more critically came to the writer. The matter has now been cleared up by Mr. Ames' recent article, "Notes on New England orchids,—I. *Spiran-*

<sup>1</sup> Proc. Acad. Nat. Sci. Phila., 1920, 110.

thes."<sup>1</sup> He finds that typical *Spiranthes cernua* grows in association with Calopogon and Arethusa, in "sour" soils, and in dry fields among ericaceous plants. The soils in such habitats normally range in reaction from specific acidity 300 down to 30 but only exceptionally go lower than that. This species is therefore evidently a high-acid soil plant. It may be noted, further, that its occurrence both in bogs and in dry fields shows that it, like other reaction-sensitive plants, is relatively indifferent to the water content of a soil.

*Spiranthes cernua* variety *ochroleuca* he states to grow, on the other hand, in "woodlands and rich upland pastures," which are likely to show a specific acidity of 10 or less. It appears, therefore, that this variety is a low-acid soil plant. The writer has found it in bogs as well as in woods, so that it also is indifferent to wetness or dryness. The reaction relations of the two plants may be brought out by a tabulation according to the plan previously used; the reaction ranges of both of them are then seen to be of the order of magnitude commonly met with in individual varieties of orchids.

Specific acidity.....	300	100	30	10	3	1
<i>Spiranthes cernua</i> , typical.....	x	x	x	?	-	-
var. <i>ochroleuca</i> .....	-	-	?	x	x	x

*Spiranthes odorata* has been found to favor subacid soils, being thus intermediate in reaction between the above two. It is difficult to agree, however, with Small, Britton & Brown, and Ames, that this plant is conspecific with *S. cernua*; for where the two grow near together, as in the vicinity of Washington, D. C., they are distinct in many respects, and have, moreover, been found to retain their distinctness when grown in cultivation side by side in the same subacid soil. Some of their more striking differences are brought out by the tabulation on the next page; Schlechter notes still others.

The writer will be glad to send fresh specimens of both plants to anyone who wishes to confirm these features, during the coming September.

It would be hard to imagine two members of a single genus being more divergent; and search for intermediate forms in places where the two grow in abundance within a few hundred meters of each other has been unsuccessful. What might have been taken for an intermediate has been collected in a cat-tail marsh at Cape May, New

<sup>1</sup> RHODORA, xxiii, 73, 1921.



	SPIRANTHES ODORATA	SPIRANTHES CERNUA
Habitat	Tidal marsh, with <i>Zizania</i> , <i>Peltandra</i> , <i>Bidens</i> , etc.	Meadows, with sphagnum, <i>Pogonia ophioglossoides</i> , <i>Gentiana saponaria</i> , etc.
Soil reaction	Subacid, the decomposing vegetation being partially neutralized by calcareous river water.	Mediacid or less commonly subacid, as in typical sphagnum bogs and mead- ows.
Blooming time	Mid-September.	Late September to late Oc- tober.
Plant habit	Up to one meter tall, with large, prominent leaves.	About 3 decimeters tall, with small, inconspicuous leaves.
Flowers:		
arrangement	In regular, slightly spiralled rows.	In rather irregular rows.
color	Dull yellowish white.	White with slight creamy tinge.
size	Up to 12 mm. long.	Around 8 mm. long.
fragrance	Extremely strong, a single spike scenting a large room.	So faint as to be detected only with difficulty.
lip	Somewhat contracted in mid- dle, and with prominent incurved callosities.	Not contracted in middle, and with rather small, little-curved callosities.
Roots	Cord-like, tough, 8-20 cm. long, mostly tipped with a shoot which forms a new plant the following season (stolons).	Fleshy, weak, 2-8 cm. long, not observed to possess terminal shoots.

Jersey (where typical *S. odorata* is unknown), but critical examination indicates it to be merely unusually luxuriant *S. cernua* var. *ochroleuca*. A protest is therefore here raised against the reduction of our magnificent fragrant "ladies-tresses" to mere varietal rank.

WASHINGTON, D. C.

THE GRAY HERBARIUM EXPEDITION TO NOVA SCOTIA,  
1920.

M. L. FERNALD.

(Continued from p. 111.)

WE were due in Halifax in the early evening and had counted on seeing the country all the way, but the chronic indisposition which seemed to afflict the government railroad reached its climax for the day in a rocky barren west of Bridgewater, with the result that we were many miles west of Halifax when darkness set in. During the very long and tedious stop in the rock-barren we had more to occupy our attention than did the hundred other travellers who had soon gathered all the early blueberries and lingering strawberries; and, although we should not recommend this area as the best place for the next breakdown, we took away the southern *Carex umbellata*, var. *tonsa* and *C. pennsylvanica*, var. *lucorum*, *Lycopodium tristachyum*, *Lechea intermedia*, and one of the neatest little shad bushes we ever saw, a beautiful shrub with stoloniferous habit, low stature (3-6 dm.) and nearly orbicular dark-green, highly lustrous leaves. Afterward, at Grand Lake, Halifax County, at Springhill Junction in Colchester County, at Middleton in Annapolis County and at various places westward we found it a thoroughly distinct and dominant shrub of barrens, either dry or wet. In habit it resembles *A. stolonifera* Wiegand,<sup>1</sup> a characteristic shrub from Maine to Virginia and in eastern Newfoundland, with dull and pale-green or glaucous foliage and with the summit of the ovary densely tomentose; but this characteristic Nova Scotian shrub with dark, glossy leaves has the summit of the ovary wholly glabrous, though it is sometimes arachnoid or sparsely pubescent. Typical *A. stolonifera* we found in Nova Scotia, though only once; but the common shrub is so well marked that it should be separated as a variety. m/

After a night in Halifax, where none of us got more than a few "cat naps," so insistent and obtrusive was the clang of the near-by fog bell, we were routed out soon after daylight to catch the "Ocean Limited" north; Bissell, Bean, White and Linder leaving the train at Truro, Long and Pease at Springhill Junction to explore barrens characterized by a scattered growth of *Pinus Banksiana* and *P.* melanoc

<sup>1</sup> Wiegand, RHODORA, xiv. 144 (1912).



*resinosa*, and I going on to Amherst. The two latter areas I had noted from the train on first reaching Nova Scotia, for they were unlike most others which I saw. The chief attraction at Amherst was a series of springy bogs and spring-fed pools by the track southward toward Nappan. In one of these pools I had seen from the speeding train a plant which upon reflection I imagined might be *Montia rivularis*,<sup>1</sup> a European species known in North America only in southeastern Newfoundland and northeastern New Brunswick.<sup>2</sup> Like so many things thus glimpsed from a train, the plant of course was not *Montia* at all, but a mass of half-emersed *Ranunculus Purshii* flecked with stranded fragments of *Lemna minor*. The latter plant, although widely dispersed in southern regions and abundant in pools and streams of eastern New Brunswick, Prince Edward Island, the Magdalen Islands and northern and eastern Nova Scotia, seems to be absent from western Nova Scotia as are the *Ranunculus* and *Lemna trisulca* with which it grew. The spring-pools below Amherst had other good aquatics which we had not seen in the western counties: *Myriophyllum verticillatum*, var. *pectinatum*, *Sagittaria cuneata* Sheldon (*S. arifolia* Nutt.) and, at their margins, swales of *Calamagrostis neglecta* or solid and almost impenetrable stands of the big bullrushes, *Scirpus validus* and *S. acutus*, forma *congestus*,<sup>3</sup> the latter a striking extreme growing apart from typical *S. acutus* and having the spikelets in a single very dense glomerule. The railroad embankment was beautiful with masses of the Harebell, *Campanula rotundifolia*, which we had not seen near Yarmouth, and with it a color-form of Butter-and-eggs, *Linaria vulgaris*, only in this form the corolla, except for the deep-yellow palate, was milk-white.

The sphagnous spruce-bog nearby is a gem, a spring-fed bog with central pond, its quaking margin full of *Carex limosa* and *C. diandra*, species common enough in the region bordering the Gulf of St. Lawrence but not found all summer in southwestern Nova Scotia. The bog was white with *Scirpus hudsonianus* and that rare and elegant cotton grass, *Eriophorum Chamissonis*, forma *albidum*.<sup>4</sup> The con-

<sup>1</sup> See Fernald & Wiegand, RHODORA, xii. 138 t. 84, fig. b (1910).

<sup>2</sup> Blake, RHODORA, xx. 104 (1918).

<sup>3</sup> *SCIRPUS ACUTUS* Muhl., forma **congestus** (Farwell), n. comb. *S. occidentalis*, var. *congestus* Farwell, Mich. Acad. Sci. Ann. Rep. xix. 247 (1917).

<sup>4</sup> *ERIOPHORUM CHAMISSONIS* C. A. Meyer, forma **albidum** (F. Nylander), n. comb. *E. russeolum*, var. *albidum*, F. Nylander, Acta Soc. Sc. Fenn. iii. (1852) and in Anders. Bot. Not. (1857) 58. *E. russeolum*, var. *candidum* Norman, Ind. Supp. 46 (1864); Hartm. Handb. ed. 11, 450 (1879). *E. Chamissonis*, var. *albidum* Fernald, RHODORA, vii. 84 (1905).

ventional *Arethusa bulbosa*, *Calopogon pulchellus*<sup>1</sup> and *Pogonia ophioglossoides* were abundant; open turfless spots were brilliant with carpets of the deliciously fragrant (pungent) *Utricularia cornuta*; and the drier knolls had *Gaylussacia dumosa*, var. *Bigeloviana*; altogether a bog with most of the plants a bog ought to have and some which are not always found.

"The Chief" or "the Old Man" had assigned the pine barrens about Springhill Junction to Long and Pease because that area is conspicuous for its hopelessly barren aspect and it was certain that if any plant of real interest were isolated there it would be detected by that unequalled pair. But when, returning to Truro for the night, they joined me in the dining-car, they reported that the region was the most sterile area imaginable, not only on account of the limited number of species on the Carboniferous sandstone but because practically all of them had given up trying to produce either flowers or fruit. Besides the two pines they had a few really good things which we had not seen in other silicious areas: *Oryzopsis canadensis* (Poir.) Torr. (*Stipa canadensis* Poir.), known from New Brunswick and Prince Edward Island but not met by us elsewhere in Nova Scotia, and *Carex acnea* and *C. albolutescens*, var. *cumulata* Bailey, afterward found on various sandy barrens. They had found one brook-bottom which had some fertility, yielding the only *Petasites palmata* of the summer; and, while waiting for the train, they had weeded the freight yard and taken away *Linaria minor*, reported in 1907 by C. B. Robinson<sup>2</sup> from Pictou Landing, and now, as it soon proved, a common weed all along the railroad to Halifax and eastward to Cape Breton; the beautiful yellow-flowered *Lathyrus pratensis*; and a strange Crucifer which proves to be *Erysimum parviflorum*, a western species now beginning to move eastward along the railroads<sup>3</sup>.

<sup>1</sup> *Calopogon pulchellus* is sometimes called *Limodorum tuberosum* L., Sp. Pl. 950 (1753), but that species rests chiefly upon and draws its specific name directly from '*Helleborine Americana; radice tuberosa*' of Martyn, Hist. Pl. Rar. 50, t. 50 (1728). The Martyn reference is the only one of the Linnean citations showing a plate, a beautiful full-page colored drawing of the plant of the Bahamas treated by Britton & Millspaugh (Bahama Fl. 96) as *Bletia purpurea* (Lam.) DC., although they cite Jacquin's *Limodorum altum*, the description of which definitely cited as a synonym Martyn's *Helleborine Americana; radice tuberosa*. *Limodorum tuberosum* L. is, of course, the earliest name for *Bletia purpurea*.

<sup>2</sup> C. B. Robinson, Bull. Pictou Acad. Sci. Assoc. i. 42 (1907), as *Chaenorhinum minus* (L.) Lange.

<sup>3</sup> See J. C. Parlin, RHODORA, x. 146 (1908).



The party exploring about Truro had started out as a quartet, following the shores of Salmon River and getting, in some of the pools, *Ranunculus Purshii* and *Myriophyllum alterniflorum*, the latter species seen by us nowhere else during the summer; but they soon divided into pairs, Bean and White working down stream to the extensive reclaimed marshes where they secured a representative collection, but too largely weeds of civilization to require special mention. Bissell and Linder soon found rich, hillside woodlands and thickets and throughout the summer, whenever we were having particularly meagre botanizing, they longingly referred to this hillside at Truro. There they added to our list *Equisetum scirpoides*, *Carex aurea*, *Ranunculus abortivus* and other plants of rich soil not found by us in the silicious country; and for the first time in the summer, though we afterward got it in rich woods or in limy talus at other stations, a very neat little *Poa* which I had long known as a unique species characteristic of Newfoundland and Prince Edward Island. In its stoloniferous habit the plant resembles *P. pratensis*, but in the very short and stiffly spreading branches of the panicle, its large lance-ovate, acuminate spikelets 5.5–7 mm. long, with very thin and lustrous, strongly 3–5-nerved lemmas, which are conspicuously white-margined, the plant seems to stand well apart. In its technical characters it apparently matches the plate in *Flora Danica* (t. 2402) of *Poa costata* Schumacher,<sup>1</sup> a little known and somewhat problematic plant described from the island of Seiland in the Baltic. In our northeastern coastwise region, Newfoundland, Prince Edward Island and Nova Scotia (fig. 5), the plant is clearly indigenous and its identity with a plant otherwise known only from the Baltic recalls

<sup>1</sup> *POA COSTATA* Schumach., Enum. Pl. Saell. i. 28 (1801); Liebm. Fl. Dan. fasc. xli. t. 2402 (1845). *P. pratensis*, var. *depauperata* Liebm., l. c. as syn. (1845). *P. pratensis*, subsp. *costata* (Schumach.) Lange, Nomencl. Fl. Dan. 91, 203 (1887). *P. pratensis*, var. *costata* (Schumach.) Lange, l. c. 329 (1887). *P. angustifolia* var. *costata* (Schumach.) Richter, Pl. Eur. 87 (1890).—The following American specimens are referred here. NEWFOUNDLAND: open woods, St. John's, August 4, 1894, Robinson & Schrenk, no. 219, in part, distributed as *P. pratensis* and subsequently given an unpublished herbarium-name by Scribner; gravelly fir and spruce woods, Clarendville, August 19 and 20, 1911, Fernald & Wiegand, no. 4,630. PRINCE EDWARD ISLAND: sphagnous clearings and thickets, Bloomfield, August 7, 1912, Fernald, Long & St. John, no. 6,897. NOVA SCOTIA: sphagnous pockets in moist, rich woods and thickets, Truro, July 18, 1920, Bissell & Linder, no. 19,995; glades by brookside in mixed woods, southern slope of North Mountain, north of Middleton, July 21, 1920, Long, no. 19,996; open woods at base of gypsum cliffs, Port Bevis, August 27, 1920, Fernald & Long, no. 19,999.

*Polygonum acadiense* Fernald, originally described from Nova Scotia but subsequently found to be a characteristic species of the Baltic.<sup>1</sup>

It was close work, after reaching Truro at 9 P. M., to get our collections into papers and be up and ready for a train leaving soon after 6; but we had some good areas noted which required the use of local, early-morning trains. Near Folleigh Lake the Intercolonial (now Canadian National) crosses a high gap in the Cobequid Hills where the traveller is invariably roused to enthusiasm as he looks down the steep slope to the beautiful Wentworth Valley and for several miles notes the unspoiled grandeur of the rich, hardwood forest, one of the few stands of virgin hardwood in the Maritime Provinces. It seemed worth while to get a good sample of the flora of a hardwood mountain-slope, so "the boys," Bean, White and Linder, were detailed to spend the day there. Pease and Long, having spent the preceding day in a hopeless barren, had earned the novel assignment for the day, the calcareous valley of 5-Mile River with its great, fantastic white cliffs of gypsum. To be sure, they had to get up by 5 o'clock and their return train would not get them back until after dark and long after supper-time. But what of that!

Bissell and I were quite happy to try our luck on the shores of Shubenacadie Grand Lake, for somewhere on those 20 miles of shore Mrs. Britton had found growing "among the rhizomes of *Osmunda regalis*,"<sup>2</sup> *Schizaea* and we vaguely hoped that the short time allowed us by the rather unaccommodating train-schedule would suffice to give us a glimpse of the plant *in situ*. As we walked down to the shore from Grand Lake station we found a common New England bullrush, which we had not seen in Nova Scotia, *Scirpus atrovirens*, var. *georgianus*<sup>3</sup> and thickets of Hobble-bush, *Viburnum alnifolium*, and other typical shrubs of the Canadian forest. The shore was composed of slaty and silicious ledges and cobble, where *Xyris caroliniana*, *Rhynchospora capitellata* (Michx.) Vahl (*R. glomerata* of the Northern States),<sup>4</sup> *Sisyrinchium gramineum*, and other coastal

<sup>1</sup> See Fernald, Botanisk Tidskrift, xxxiv. 253 (1916); Ostenfeld, *ibid.*, 254; Fernald, Am. Journ. Bot. v. 229 (1918).

<sup>2</sup> Gray, Bot. Gaz. v. 4 (1880).

<sup>3</sup> *SCIRPUS ATROVIRENS* Muhl., var. *georgianus* (Harper), n. comb. *S. Georgianus* Harper, Bull. Torr. Bot. Cl. xxvii. 331, t. 22 (1900).

Since this was first noted (RHODORA, viii. 163) in 1906 as a common plant of the Northeast, repeated attempts to keep it apart from *S. atrovirens* have shown that it is hardly a species, but rather a fairly pronounced variety.

<sup>4</sup> See Blake, RHODORA, xx. 28 (1918).



plain plants abounded; and after following these ledges for half an hour, each of us with *Schizaea* of the wet bogs in his mind's eye but both stolidly refraining from complaint of the unpromising habitat, dry ledges with their thickets of Low Blueberry, *Vaccinium pennsylvanicum*, Black Huckleberry, *Gaylussacia baccata*, and the Nova Scotian representative of *Amelanchier stolonifera*, with an occasional damp pocket full of *Carex polygama* or *Rhus Toxicodendron*, Bissell finally broke the monotony by firmly asserting that it was foolish to expect *Schizaea pusilla* on dry ledges and that we might as well give it up or hunt for a boggy shore. The latter course seemed preferable, so, remembering a wet shore we had seen from the train, we retraced our steps toward it. Still hoping against hope I was watching every crevice when my eye detected a puzzling Violet. Dropping upon my knees, I carefully inserted my hand-pick into the rock-crevice and dug out the first Violet, and with it *Schizaea*. *Schizaea pusilla* of the bogs here growing in dry rock-crevices! We did not hunt up the boggy shore but picked and chiseled *Schizaea* from the ledges until a violent shower drove us to shelter.

In the shelter of the station we sorted our collections and found that the plant of the gravelly lake-margin, with quill-like leaves closely suggesting those of the Cape Cod *Sagittaria teres*, was really young material of the aquatic plantain, *Littorella americana* Fernald,<sup>1</sup> an extremely rare plant which Mrs. Britton had collected<sup>2</sup> on the shore of Grand Lake in 1879. The milkweed of the wet gravel suggested *Asclepias incarnata*, var. *pulchra*, but it had few, very short leaves (the longest 4.5–6.5 cm. long) glabrous or only minutely and very remotely hirtellous beneath. I had at times imagined that there might be a specific line between *A. incarnata*, with its elongate, essentially glabrous leaves and deeper-colored flowers, and *A. pulchra* Ehrh., with its oblong or elliptic leaves decidedly hairy beneath and its commonly paler flowers; but this Grand Lake material and a similar colony afterward found on Tusket Lake has the leaves even shorter and broader (in proportion) than in *A. pulchra* but as smooth as in *A. incarnata*.

We got back to Truro long before supper and had our collections in papers when the party returned from Folley. We had correctly

<sup>1</sup> RHODORA, xx. 62 (1918).

<sup>2</sup> E. G. Knight as reported in Bull. Torr. Bot. Cl. vii. 1 (1880); Gray, Bot. Gaz. v. 4 (1880); E. G. Britton, Linnaean Fern Bull. iv. 17 (1896); all as *L. lacustris*.

interpreted the region, to the extent at least of diagnosing it "rich woods:" *Polystichum Braunii*, *Carex scabrata* (fig. 9), *Habenaria macrophylla* and *H. bracteata*, *Arisaema triphyllum*, var. *Stewardsonii* (Britton) G. T. Stevens,<sup>1</sup> the Canadian representative of the more southern or Alleghenian *A. triphyllum*, *Ranunculus recurvatus*, *Amelanchier Bartramiana* (Tausch) Roemer,<sup>2</sup> *Viburnum alnifolium*, etc.

When, toward 9 o'clock, the 5-Mile River party came in, they were a tired, hungry and rain-soaked pair. They had been out since early morning in the richest spot of the summer and their sneakers and clothes plainly showed the result of a day of enthusiastic exploration of the knife-sharp pinnacles and unyielding talus and crests of gypsum. They had repeatedly emptied their collecting boxes and were loaded down with two rucksacks, a large bundle and two boxes full of specimens and had been forced to quit on account of darkness,—385 specimens of 154 species from a limy district, but not at all the plants of the acid coastal plain such as Bissell and I had got at Grand Lake or which abound in Yarmouth County: *Cystopteris bulbifera* (fig. 6), *Carex eburnea*, *Sphenopholis pallens*, *Amelanchier canadensis*<sup>3</sup> (fig. 8), *Fragaria vesca*, var. *americana* and *Erigeron hyssopifolius* (fig. 7) from the cliffs and talus; *Pteretis nodulosa* (Michx.) Nieuwl.,<sup>4</sup> *Athyrium acrostichoides* (Michx.) Milde,<sup>4</sup> *Milium effusum*, *Festuca nutans*, *Asperella hystrix* (L.) Humb.,<sup>5</sup> *Carex rosea*, *C. retrosa* and *C. Deweyana*, *Lilium canadense* (fig. 10),

<sup>1</sup> *A. triphyllum*, var. *Stewardsonii* is often very distinct and in its extreme development seems like a good species, but too often transitional forms occur and the plant seems to be best treated as a geographic variety. Bicknell has treated it as "a state or form" of *A. pusillum* (Peck) Nash (Bicknell, Bull. Torr. Bot. Cl. xxxvi. 1) and states that "the evidence appears unmistakable that the two plants are extreme variations of a single species." *A. triphyllum*, var. *pusillum* Peck is a coastal plain extreme extending from Texas to Oklahoma and Florida, thence north to southeastern Massachusetts. Var. *Stewardsonii*, in its best development, occurs from Prince Edward Island to Vermont and Pennsylvania and perhaps to the mountains of Georgia. At least, the material in the Gray Herbarium referred by Dr. Gray to *A. quinata* (Nutt.) Schott (*Arum quinatum* Nutt.), a reputed species described from Georgia as distinguished from *A. triphyllum* by its "Leaves quinate, lanceolate, acuminate," shows leaves bright green below as in var. *Stewardsonii* and varying on the same plant from ternate to quinate, and the slope of the recurved flange at base of the hood exactly as in the northern var. *Stewardsonii*. In var. *Stewardsonii* of New England the leaves, although normally ternate (as are the majority of leaves of "*A. quinata*"), are sometimes quinate or with the lateral leaflets deeply parted.

<sup>2</sup> See Wiegand, RHODORA, xiv. 158 (1912).

<sup>3</sup> As interpreted by Wiegand, RHODORA, xiv. 150 (1912).

<sup>4</sup> See Weatherby, RHODORA, xxi. 178 (1919).

<sup>5</sup> See Hubbard, RHODORA, xiv. 187 (1912).

*Listera convallarioides*, *Ostrya virginiana*, *Laportea canadensis*, *Dentaria diphylla*, *Geum canadense*, *virginianum* and *strictum*, *Circaea latifolia* Hill,<sup>1</sup> *C. canadensis* Hill,<sup>2</sup> *Sanicula gregaria*, and *Viburnum Opulus*, var. *americanum* from the alluvial or other rich woods; and *Sagittaria cuneata* Sheldon (*S. arifolia* Nutt.), *Carex riparia*, var. *lacustris* (Willd.) Kükenthal and *Nymphozanthus rubrodiscus* (Mowbray) Fernald,<sup>3</sup> from the pools. rong

Only the impossibility of properly preserving such a bulk of choice specimens without driers and presses and the insistent demands of our schedule could drag us at once away from a region so full of interesting spots, and this in spite of the hotel at which we were lodging. We were told that if we went to one of the hotels we should wish we had gone to the other, so we went to the other. Afterward, while visiting friends at Baddeck, we were told of one of their recently departed guests who had wired back, much to the bewilderment of the Gaelic telegraph-operator: "Spent a week this morning in Truro!" They could not tell us where he breakfasted.

Starting, by express, to Yarmouth our many bundles of specimens, already laid out in white paper but without driers, we ourselves went on the morning of July 20 to Middleton in the Annapolis Valley, a fascinating trip with its diversity of landscape: the great reclaimed marshes west of Truro; the ragged, white gypsum cliffs in the woods which Pease and Long pointed out to us, and others near Windsor; the great red-mud canons, deep down in the bottoms of which meandered at low tide tiny streams soon to be changed by the Fundy tides to broad and deep brick-red rivers; the great hayfields with the monument to Evangeline at Grand Pré and beyond them Blomidon capped with cloud; the miles and miles of apple and peach orchard closely cultivated and putting to shame our neglected New England orchards of rock-pastures and otherwise useless spots. Near Berwick and from there to Wilmot were vast uncultivated plains carpeted, wherever dry enough, with a close growth of the New Jersey pine barren *Corema Conradii*, and, although these barrens were the finest we saw, we had to content ourselves with small and unspoiled remnants of them at Middleton. Unspoiled, because, although these *Corema* heaths are forbidding enough in appearance and at the sur-

<sup>1</sup> See Fernald, RHODORA, xvii. 222 (1915).

<sup>2</sup> See Fernald, RHODORA, xix. 87 (1917).

<sup>3</sup> RHODORA, xxi. 187 (1919).



face are highly acid and barren, when deeply plowed and cultivated they are transformed into the great orchards for which "the Valley" is everywhere famed.

The *Corema* plains at Middleton, if a fair sample, as they doubtless are, indicate that the vast stretches of such country farther east will yield interesting results. "All hands" browsed over these plains, during the afternoon, and although we became scattered, Long, Pease and I eventually found ourselves within hailing distance and our observations will suffice for the party. The drier places, where *Corema* is dominant, had dewberries, mostly *Rubus arenicola* Blanchard, one of the characteristic trailers of Cape Cod and of York County, Maine, and the sand-barren *Viola fimbriatula*, *Lechea intermedia*, *Potentilla tridentata*, which abounds among the dunes at Provincetown and elsewhere near the tip of Cape Cod, and endless variations of *Vaccinium pennsylvanicum*, both the forms with yellow-green foliage and those with glaucous leaves, the series of variants called var. *nigrum*. A singular form of the glabrous variety of *Panicum depauperatum* was abundant, always with the inflorescences hidden at the base of the plant, and only when wandering into disturbed railroad-gravel or cultivated land assuming its ordinary appearance, with well-developed panicles on elongate culms. In the damper *Polytrichum*-carpeted areas *Sisyrinchium arenicola* (see p. 96) was found, and such places were characterized by *Carex atlantica*, *C. foenea*, var. *perplexa*, *C. albolutescens*, var. *cumulata*, and, more abundant than any, a sterile *Carex*, seeming to be a hybrid of the latter and the ubiquitous *C. scoparia*. *Bartonia virginica* was everywhere and the lustrous-leaved *Amelanchier stolonifera* abounded, though sadly denuded by some catápillar, and *Pyrola rotundifolia*, var. *arenaria* was there, though scarce. 27

In 1910, the late Dr. E. L. Greene, apparently making a change of trains at Middleton (a junction point), collected a purple *Gerardia* (now correctly known as *Agalinis*) and described it as *Gerardia neoscotica*. One of our reasons for stopping off at Middleton was to search for the type station for this northeastern representative of a southern genus and to secure good material. The search did not involve great difficulty for, in following a cartroad, Bissell and Linder promptly came upon Greene's original spot (clearly indicated in the original description) and collected material. By the time they got it back to the hotel most of the corollas were gone, so before break-

fast next morning Linder conducted me to the spot where we laid a good supply of freshly flowering specimens into folds of paper and he secured a good portrait of the growing plant. Subsequently, to be sure, the species proved to be ubiquitous in western Nova Scotia so that we got it in all stages of development, even to the large bushy-branched plants 3.5 dm. high with mature fruit, but it was gratifying to have a series from the type station. Dr. Harold St. John also collected the plant on Sable Island in 1913 so that it will doubtless prove to be generally distributed in the silicious areas of the province. Our collections embrace 25 numbers and the characters originally pointed out by Greene are amazingly constant: the broadish rather fleshy leaves (which do not quickly curl as do the linear-attenuate leaves of *Agalinis paupercula*); the very long and foliaceous scabrous-serrulate calyx-lobes and the almost tubular little corolla with only slightly spreading lobes. To Greene's statement of characters should be added the facts that the mature capsule is shorter than to barely equalling the calyx, and that the mature calyx-lobes tend to become divergent. The corollas have no yellow lines in the tube, but whether this character is diagnostic can be determined only by further observation of fresh material of *A. paupercula*. Altogether the plant seems to be a clearly marked species.<sup>1</sup>

On July 21 we had the first break in our party and one which we keenly felt, for every one who knows Stanley Pease, his quick wit and kindly humor, will appreciate the loss we felt when he took the first train to Digby, thence to return to "the States." He and I spent a short morning, until his train left, on the plains about Middleton, collecting better material of some of the specialties but adding little of importance to the discoveries of the day before. Bissell, Bean, White and Linder drove across the North Mountain to the shore of the Bay of Fundy at Margareville, bringing back such well-known plants of this basaltic coast as *Iris setosa*, var. *canadensis*, *Primula farinosa*, var. *macropoda* and *Euphrasia purpurea*, var. *Randii*. Long spent an exasperatingly short hour testing the rich woods and swales on the southern slope of the basaltic North Mountain, just glimpse enough for him to yearn all summer for another and extended visit to the slope where he had collected *Equisetum scirpoides*, *Poa costata*,

<sup>1</sup> *AGALINIS neoscotica* (Greene), n. comb. *Gerardia neoscotica* Greene, Leaflets, ii. 106 (1910). *A. paupercula* (Gray) Britton, var. *neoscotica* (Greene) Pennell & St. John, Proc. Bost. Soc. Nat. Hist. xxxvi 93 (1921).

*Carex scabrata*, *Juncus Dudleyi*, *Trillium erectum*, *Corallorhiza maculata*, *Dentaria diphylla*, *Geranium Robertianum* and *Osmorhiza divaricata*, the latter a northern species new to the western counties but previously found by Nichols in Cape Breton and afterward collected also by Long and me about gypsum talus in Cape Breton.

We reached Yarmouth that evening and the next three days were occupied until late in the evenings with our presses. The 5000 driers proved wholly inadequate, for Yarmouth was wrapped in its conventional blanket of fog and sun-drying was out of the question. We had already been driven to various expedients to meet the penetrating dampness and now with great regularity, as soon as corrugated ventilators had been inserted, the presses were stacked high in a square about the kerosene stove or suspended over it from the rafters. The wet driers for immediate use had to be "toasted" while such as could be allowed a more prolonged aeration were tucked end-on into chinks in the rough boarding of the empty hay-loft. The act of thus fitting the rough ends of the driers into shallow chinks from which they drooped soon became a real art and with the aid of a ladder we were eventually able thus to decorate the rough sloping walls of the loft with nearly 2000 driers at one turn.

The 23rd was for us an unfortunate day, for Bissell felt that he must get home but he had had a taste of Nova Scotia botanizing and the leaven continued to work after he got back to Connecticut; for later in the summer he took another vacation and one morning appeared ready for work just as we were going down to breakfast.

On the afternoon of the 24th there was time for a short half-day's collecting so the amended party, Long, Bean, White, Linder and I went after the weeds of the docks, railroad yards and waste heaps of Yarmouth. We scattered in different directions and the more interesting weeds of the day included typical *Sisymbrium officinale*, apparently commoner in Nova Scotia than var. *leiocarpum*, *Coronopus didymus*, *Lepidium Draba*, *Iberis amara* L., and *Carduus acanthoides*.

Next day, July 25, we were ready for field work and since, on the earlier visit, we had had only a glimpse of either Beaver Lake or Cedar Lake, we went there; Long and Linder stopping off for the day at Beaver Lake; Bean, White and I going on to Cedar Lake. Many of the plants of July 11th were now in splendid condition, the cespitose and nearly beardless *Pogonia ophioglossoides* forming extensive colonies with well-formed fruit, and, abundantly intermixed with it



in the cobble-beach, *Ophioglossum vulgatum*, so closely similar that it required real care to separate the two; and even after the plants were in press we found roots of *Ophioglossum* tangled with those of the *Pogonia*. *Panicum spretum* had developed wonderfully and now formed a handsome and almost continuous belt at the upper border of the beach, and in the cobble-beach with the *Pogonia*, *Ophioglossum* and *Liparis Loeselii* there was the usual series of intergrades between typical *Botrychium dissectum* and the var. *obliquum*.

In the inundated peaty border of Beaver Lake, Long and Linder were getting *Utricularia minor* and, in fine flower, the common but rarely flowering *U. intermedia*, and near by a beautiful tall *Panicum*, in habit resembling *P. spretum* but with broad panicle and very ciliate sheaths and densely bearded nodes, one of the complex of plants which is treated by Hitchcock & Chase as many species: *P. Lindheimeri*, *P. huachucae*, *P. tennesseense*, *P. languidum*, etc., but this plant is nearer the type-material from Texas of *P. Lindheimeri* than to the others. In sending to a contributor to RHODORA a galley proof in which *Panicum* was mentioned the editor once made the penciled query opposite one expression: "Redundant?" The proof came back without change except for the added comment: "The spikelets of all the *Panicums* are redundant." Be that as it may, it is certain that many of the species of *Panicum* as recognized at present in America are highly redundant. The four above mentioned are clearly phases of one species but I am not yet certain that there are not still more of their variants similarly masquerading as species. At the margin of the lake they found the unique *Myriophyllum tenellum*, and when, returning from Cedar Lake, we stopped to take them in, Long was a half-mile away on the barrier beach below the mouth of Beaver River, whence he returned with *Carex silicea*, the characteristic whitish-brown sedge of our southern dunes.

Our botanizing had developed a pendulum-swing, first north then south, so on the 27th, as it was the turn to work south, we went to Belleville station, Long and Linder working eastward to explore some of the lakes in that direction, Bean, White and I going west around the shore of Eel Lake and on to Abram River. Eel Lake is decidedly brackish, where we examined it full of *Potamogeton pectinatus* and *Ruppia maritima*, var. *longipes* Hagström,<sup>1</sup> which is abund-

<sup>1</sup> See RHODORA, xvi. 125 (1914).

ant in maritime pools southward quite to tropical America. The rocky shore, too, had maritime plants: *Samolus floribundus* in wet crevices, *Teucrium canadense*, var. *littorale*, and *Juncus articulatus*, var. *obtusatus*. West of Eel Lake we came to an extensive, dry, *Polytrichum*-covered barren with meagre enough vegetation but with *Habenaria blephariglottis* and *Ilex glabra* abundant, even dominant in some areas, *Carex aenea*, which we had had only from Springhill Junction, and a good number of *Panicums*. The brackish marshes along Abram River contained extensive sloughs full of *Scirpus Olneyi*, which, when we first got it at Sand Beach, had seemed a thrilling discovery; a small quagmire at the border of the barren was full of *Utricularia geminiscapa* Benj. (*U. clandestina*); and a wet cart-road was bordered by *Juncus acuminatus* and *J. marginatus* (one of the long discredited plants of Lindsay's *Catalogue*).

When we returned to Belleville station Long was closely studying the railroad-bed—to find more of the curious little weed with short, club-shaped scapes and tiny dandelion-like heads, *Arnoseris pusilla*. The plant, a wanderer from Europe, is well established at this point and is likely to spread, since no one bent on gathering a bouquet will disturb it. Long and Linder had got into dry barrens where *Corema* abounds but most of the lakes had hopelessly inaccessible shores, flooded high into the bushes and bordering swales where, floundering through the acres of *Sparganium americanum* or *Pontederia* one would take his life in his hands (or more likely consign it to the waters). They had succeeded, however, in finding enough accessible shore at Clearwater Lake and at another, called Minnigobake, to secure *Cyperus dentatus*, which we had not previously collected, *Ophioglossum vulgatum*, occurring in cobble-beach as at Cedar Lake, *Myriophyllum tenellum* and *Subularia aquatica* again and, of course, *Utricularia subulata*. The most striking discovery, however, was that of *Juncus subcaudatus* (Engelm.) Coville & Blake,<sup>1</sup> in the wet border of a spruce swamp. This plant, treated in the 7th edition of the Manual as a southern variety of *J. canadensis* (ranging north to Rhode Island, although Long and I have subsequently got it on Cape Cod), we found through the rest of the season to be a thoroughly characteristic denizen of boggy woods or openings in spruce swamps from Digby Neck south through Yarmouth County thence

<sup>1</sup> Coville & Blake, Proc. Biol. Soc. Wash. xxxi. 45 (1918).

east to Queens County; but, although clearly belonging with *J. subcaudatus*, the Nova Scotian plant differs in having a shorter perianth with broader and greener uncorrugated sepals and thus constitutes an endemic Nova Scotian variety.

There is a little sand- and cobble-bordered lake by the railroad about a mile south of Lake Annis. We had more than once specially noted it as a promising spot, consequently on July 29, Bean, White and Linder went there to try their luck. They soon learned that this is Jassy Lake and if we had not begun to be satiated with *Utricularia subulata*, *Subularia aquatica* and *Myriophyllum tenellum*, would rank as a good spot. They brought back *Solidago canadensis*, which sounds uninteresting, but singularly enough, during the whole summer we did not see this characteristic Canadian species in southern Yarmouth County nor in Shelburne and Queens Counties, its place in swampy thickets being there preempted by another plant not yet in flower but decidedly not *S. canadensis*. They also had a very delicate *Utricularia*, the material all sterile but in the capillary forking of its leaves and in its bladders closely matching *U. gibba*.

The glimpse of Trefry's Lake which Pease and I had got two weeks earlier had stayed vividly in my mind throughout that crowded and ever-changing fortnight and Long was not averse to visiting its shores, so, while the others were at Jassy Lake, he and I spent one of the happiest days of the summer, making an almost complete circuit of the lake. The vegetation had greatly changed in two weeks and, owing to frequent rains and prolonged fog, the narrow beach had become almost invisible. As we started in we came upon *Sieglingia decumbens* in the most *natural* spot of the summer, at the upper border of the beach next the thicket, but there was a cow-path nearby so that here as elsewhere the evidence of its native character was inconclusive.

The very distinct goldenrod of the subgenus *Euthamia*, which we had been watching at other lakes, was now in good condition in the shallow water, though the plants higher on the beach were not yet flowering; a beautiful little plant with tall, simple stems rarely branching at the summit and with very fleshy and firm, dark-green mostly 1-nerved, linear-oblong to linear-lanceolate, blunt or merely acute, erect leaves, and with the deep-yellow heads so densely crowded as to make the corymb appear like a handsome golden button commonly only 1 or 2 cm. in diameter, or in extreme plants like a few



crowded buttons. This plant was seen or collected throughout Yorkmouth County and eastward in the silicious belt as far as Queens, everywhere dominant and thoroughly characteristic of these sandy and cobbly lake-margins. Close study, however, fails to reveal any specific characters in the heads by which the Nova Scotia plant can be constantly distinguished from the coastal plain *Solidago tenuifolia* and it is, consequently, here treated as a pronounced geographic variety of the southern *S. tenuifolia*.

We had been closely watching *Utricularia cornuta* for, when the plants were still young and before the corollas expanded, we had noticed that in some colonies the flowers were approximate at the summit of the stem as good *U. cornuta* is supposed to have them, while in other colonies or often in the same colony were plants with the flowers scattered along the upper part of the stem, a character which, with its smaller flowers, is supposed to distinguish *U. juncea* of South America, the West Indies and the southern coastal plain. *U. cornuta* was at last in prime condition and here, on the beach of Trefry's Lake, were many plants with flowers as small as in the smallest-flowered *U. juncea*, but closely approximate; while at neighboring lakes we found colonies with flowers larger than we had ever before seen in *U. cornuta* but as remote as in *U. juncea*. *U. juncea* is said to have a less spreading margin to the lower lip but if this character proves no better than the others ascribed to it, it will be evident that, when in 1847 Benjamin<sup>1</sup> treated the two as one species, he was not far from the truth.

Slightly beyond the *Smilax* tangle where Pease and I had turned back there was a second mass of Cat Brier, only this was *S. rotundifolia*, var. *quadrangularis*, a coastal plain variety previously known northward to Nantucket and Cape Cod. The name *quadrangularis* is most unfortunate, since the finer branches and branchlets of typical *S. rotundifolia* are as often as not quadrangular, the distinctive feature of the variety being its ciliate leaf.<sup>2</sup> While Long was gathering specimens of the *Smilax*, I was absorbed in contemplation of the golden-rod growing at the border of the spruce swamp, still immature but surely *Solidago Elliottii*, a thoroughly distinctive species, originally from Carolina and Georgia, named for Stephen Elliott, the great botanist of South Carolina, and "rare and local" even in south-

<sup>1</sup> Benj. Linnaea, xx. 305 (1847).

<sup>2</sup> See Bicknell, Bull. Torr. Bot. Cl. xxxvi. 10 (1909).

ern New Jersey; and north of the Cape Cod region so extremely rare that its single station on the Neponset meadows, south of Boston, has long been a famous spot. I was also worried by a shrub with lustrous dark-green leaves which looked amazingly like some Azalea, but close examination showed that the Nova Scotian shrub was an extreme form of *Rhodora*, *Rhododendron canadense* (L.) Torr., forma *viridifolium* Fernald,<sup>1</sup> quite lacking the grayish bloom which usually characterizes the foliage and new twigs of that shrub. At the northern end of the lake is a deep sluggish creek of indefinite depth, blackness and breadth which could be crossed only by finding a rare leaning tree or log; and during the hunt for such a bridge we struggled through a dense tangle of *Rosa palustris* and *Smilax rotundifolia*, southern types now losing their novelty and later on found to be frequent species, the *Smilax* seen northward to the banks of Sissiboo River in Digby County and eastward to the banks of Sable River in eastern Shelburne County.

In this thicket grew the characteristic coastal plain variety of *Juncus effusus*, the plant with slender purple sheaths, pliant and conspicuously corrugated culms, as in vars. *conglomeratus* and *Pylaei*, but with perianths intermediate between those of the other two varieties. This plant is general on the coastal plain from South Carolina to southern Maine and in Nova Scotia. West of the creek for some distance the spruce and red maple swamp was so extremely palpitating at the border of the lake that we were forced some distance back through the everywhere dominant Inkberry and Chain Fern, the monotony occasionally relieved by *Calla palustris*, which seems to be rare in southwestern Nova Scotia. One of the coves at this side of the lake had, far out in deep water, a broad belt of some aquatic *Sparganium*, and we made frequent attempts along the quaking margin to find stranded fragments. Failing in this and coming to surer footing, we waded out as far as possible and with the aid of a small tree succeeded in dragging in a tangle from the *Sparganium*-belt, the northern *S. fluctuans*, ranging from Quebec to northern Connecticut and Minnesota, and with it a mixture of the coastal plain *Utricularia purpurea* and sterile fragments of the characteristic New Jersey pine barren *Potamogeton confervoides*, a species also common in eastern Newfoundland but not heretofore known from Nova Scotia.

<sup>1</sup> Fernald in Wilson & Rehder, Mon. Azal. 122 (1921).

The evening train into Yarmouth whistled a couple of hours before we had completed the circuit of Trefry's Lake, but so keen were our interest and enjoyment, that last trains were not to be considered, and when we finally got back to our starting point a seven-mile road-walk was between us and Yarmouth. There were a few remnants left from lunch and, after passing the village of Arcadia, we left the dusty road and enjoyed our simple arcadian meal while closely scrutinized by the cattle of a roadside pasture.

Next day, we were more than crowded in putting up our specimens and overhauling the presses and at night we lost Bean, who was obliged to return home.

The map indicated some small ponds not far west of Hectanooga station and, consequently, on July 31, Long and Linder tried to find them, but not even the oldest inhabitant, whose acquaintance they promptly made, knew of any such ponds and they were forced to content themselves with Hectanooga Lake and the very unsatisfying Little Doucette Lake. These lakes, although not up to our somewhat exacting standard, furnished a few good things: the largest *Isoetes* of the summer, with bulbous base 4.5 cm. in diameter, the coastal plain *Potamogeton Oakesianus* which we had not had, *Najas flexilis*, also the first of the season, and one of the representatives of the complex group passing as *Sagittaria graminea*; and in the woods, which they reported as rich and unspoiled, were *Agri-  
monia gryposepala*, the northern *Pyrola secunda*, var. *obtusata*, and other plants indicating essentially virgin forest.

White and I, at the same time, had drawn a more prolific area, Salmon or Greenville Lake, where the reconnoitering party of the 13th had found *Galium tinctorium*. We left the car at the southwest corner of the lake and made our way across a boggy pasture to the shore. At the point where we reached the lake a cold brook enters and in it grows a splendid clump of the tall, perennial smartweed described by Small as *Polygonum punctatum*, var. *robustum*, a handsome plant ranging northward from South America but heretofore unknown east of Massachusetts. Subsequently, however, we found it at other stations in Yarmouth County (fig. 13) always characteristic and here as from Massachusetts to South America constantly differing from *P. acre* (or *P. punctatum*) in its very stout stems; strong, perennial, woody rootstock with coarse basal offshoots; more approxi-



mate and more truncated ocreolae; long-exserted fruiting pedicels; larger, always trigonous, achenes with concave faces; and distinctly later flowering season. The plant seems to be a perfectly definite species which should be called *Polygonum robustius*.<sup>1</sup> The shore was inviting in both directions, up the west side of the lake or around the southern end, and as a decision had to be made we chose the southern end. *Polypodium vulgare*, here having no rocks to grow on, was climbing the tree-trunks, the creeping rootstocks ascending in the crevices of the bark to a height of 2 or 3 meters. *Rosa palustris* and *Smilax rotundifolia*, with the variety *quadrangularis*, soon proved to be common, as were *Apios tuberosa* and *Woodwardia virginica*, but here the Chain Fern was growing in the cobbly beach of the lake. One of the Joe Pye Weeds was also frequent at the upper border of the beach; not, however, the widely dispersed Canadian species, the plant treated by Wiegand<sup>2</sup> as *Eupatorium maculatum* L. and by Mackenzie<sup>3</sup> as *E. Bruneri* Gray, but, as we might have predicted, the coastal plain plant, heretofore known from South Carolina to southern New Hampshire, *E. verticillatum* of Wiegand's treatment or *E. purpureum* of Mackenzie's. All the *Sisyrinchium gramineum*, an abundant plant in the cobbly shore, had quite simple scapes, thus simulating *S. angustifolium*, but its paler bluish flowers and its fruits were clearly those of *S. gramineum*. The plant, however, which most interested us, was an abundant *Habenaria* of the cobbly beach. In aspect strongly suggesting the frequent *H. flava* of the northern states, this plant differed in its very attenuate and narrow leaves chiefly borne toward the base, so that the flowering stem was subscapose, and in its extremely slender and open raceme of small greenish flowers with very short bracts. Subsequently the plant was found at various stations in the Tusket Valley, differing strikingly from the plant which passes as *H. flava* in New England and thence west to Minnesota and Missouri, south in the uplands to the Carolina Mountains; the latter plant having the broader, more elliptic and less attenuate leaves running higher up the stem and the raceme more compact and usually with much longer bracts. Detailed

<sup>1</sup> *Polygonum robustius* (Small), n. comb. *P. punctatum robustior*[us] Small, Bull. Torr. Bot. Cl. xxi. 477 (1894). *Persicaria robustior* (Small) Bicknell, Bull. Torr. Bot. Cl. xxxvi. 455 (1909).

<sup>2</sup> Wiegand, *RHODORA*, xxii. 64 (1920).

<sup>3</sup> Mackenzie, *RHODORA*, xxii. 165 (1920).

study shows that the plant of Yarmouth County is true *H. flava* (*Orchis flava* L.),<sup>1</sup> a species which in its typical form occurs on the coastal plain from Texas to Florida and New Jersey, the more inland plant being *H. flava*, var. *virescens*.<sup>2</sup>

We were in the midst of an exceptionally prolonged Yarmouth fog, and it was not until August 4th that we had a sufficient quantity of "toasted" driers to carry the accumulated collections safely through press. On that day, however, all four of us made excursions into the edge of the barrens in the eastern section of Argyle; Long and Linder trying the area near Argyle Head, White and I going on to the extensive barren between Lower Argyle and Goose Lake.

After passing through ordinary spruce woods, White and I came upon the dryish sphagnum border of the barren, at this season dominated by Bakeapple, *Rubus Chamaemorus*, which had not fruited well, *Carex oligosperma*, *Gaylussacia dumosa*, var. *Bigeloviana*, *Empetrum nigrum*, *Ilex glabra*, and *Calamagrostis Pickeringii*, var. *debilis*, with *Habenaria blephariglottis* scattered everywhere. Toward the wet center of the boggy barren there is a series of shallow pools, where in spring a considerable stream must flow. The borders of these pools are marked by the most spectacular growth of Pitcher Plant, *Sarracenia purpurea*, we had ever seen, while the open mucky spots were brilliant with solid carpets of *Utricularia cornuta*; and the pools themselves were often filled with the coastal plain *Scirpus subterminalis* and *Potamogeton Oakesianus*. East of the central pools the barren becomes very dry, carpeted with *Cladonia rangiferina*, *Corema Conradii*, *Empetrum*, *Scirpus cespitosus*, var. *callosus* and other such plants of dry heaths; and it was while here collecting *Bartonia virginica* and that puzzling little *Melampyrum* of northern bogs, that we came upon *Schizaea pusilla*, this time growing in hollows of the *Cladonia* carpet.

Goose Lake itself proved very uninteresting, bushed close down to the bouldery shore, so that we started back toward the railroad by a new route and quickly found ourselves in an extensive quagmire, where the particularly interesting plant was *Xyris montana*,

<sup>1</sup> "The specimens in the Linnaean and Gronovian herbaria are comparable to the specimens with elongated racemes frequently found in the South and Southwest"—Ames, *Orchid*, iv. 45 (1910).

<sup>2</sup> *Habenaria flava* (L.) Spreng., var. *virescens* (Muhl.), n. comb. *Orchis virescens* Muhl. ex Willd., *Sp. Pl.*, iv. 37 (1805). *O. flava*, var. *virescens* Green, *Cat. Pl. N. Y.* 60 (1814).

here in greatest profusion and forming in the wettest hollows an almost continuous carpet. In collecting sods of this northern representative of an austral genus we constantly found our hands filled with loose needle-like flowering and fruiting scapes, for in this species, it appeared, the scapes are unique in freely disarticulating at the very base, all our other species of *Xyris* firmly holding their fruiting scapes through the winter. At the western border of the barren we noticed a particularly wet quagmire and, although we had only a few minutes to train-time, we were so strongly tempted to take a peep that we ventured into the slough,—*Schizaea* everywhere, here in the wettest of moss- and liverwort-carpets, two *Bartonias*, one of them suggesting the Newfoundland *B. iodandra*, the other obviously neither that nor *B. virginica* of the drier barren, and *Arethusa bulbosa* abundantly fruiting. Here was a case of the luck we all have experienced,—the discovery of a choice spot on the way home—but there was nothing to do but to make mental note of it as a place which needed further exploration.

A few miles to the north, about Argyle Head, Long and Linder had also been collecting *Bartonias* and *Xyris montana*, but their other specialties were different from ours: *Juncus subcaudatus*, *J. marginatus*, *Eleocharis rostellata*, *Polygonum robustius* and the tree-climbing *Polypodium* again; and some good things we had not previously had, *Woodwardia areolata* and *Rhexia virginica* on the bushy shore of Randel Lake, the *Woodwardia* not heretofore definitely known east of southern New Hampshire, *Hypericum dissimulatum*<sup>1</sup> described by Bicknell from York County, Maine, Nantucket, Martha's Vineyard, Long Island and southward, *Rynchospora capitellata*, var. *discutiens* (Clarke) Blake,<sup>2</sup> which Long and I had found the preceding year on Cape Cod but otherwise unknown except in North Carolina and as a member of the famous, isolated coastal plain flora of northern Indiana, the southern *Eleocharis Robbinsii*, and, in good fruit, *Potamogeton confervoides* and, to add a northern flavor, *Euphrasia canadensis* Townsend,<sup>3</sup> a characteristic species occurring from the Gulf of St. Lawrence to the foothills of the White Mountains.

On August 6, White followed the too prevalent fashion and returned home, leaving Long, Linder and me to carry on the work. On the

<sup>1</sup> Bicknell, Bull. Torr. Bot. Cl., xl. 610 (1913).

<sup>2</sup> Blake, RHODORA, xx. 28 (1918).

<sup>3</sup> See Fernald & Wiegand, RHODORA, xvii. 195 (1915).



trip to Halifax we had noted along the bay south of Barrington some very attractive white sand hills and, since the nearest approach to such a habitat we had yet explored was the barrier beaches, we started on the morning of August 7 for Barrington. The train, as usual, was crowded and I found myself sharing a seat with a most interesting companion, Mr. John Kelly, Superintendent of the Lighthouses of western Nova Scotia and the Bay of Fundy. Mr. Kelly greatly relieved my mind by assuring me that the period of fog, which was still at its height and which had already lasted without interruption for more than 300 hours, was in reality abnormally protracted, most summer fogs of western Nova Scotia lasting less than 100 hours without at least a few hours of sunshine. From Barrington we were driven to Villagedale where the best dunes are situated, great white dunes invading the forest and in the rolling fog marvelously spectacular and magnified. As usual, there were broad flats among the hills, but *Xyris montana* of the quagmires seemed strangely out of place in such a habitat. *Limosella subulata*, *Sagina nodosa* and *Polygonum Raii* Bab.<sup>1</sup> were there, as we had hoped, and so was the always interesting *Tillaea aquatica*. *Juncus bufonius*, luxuriating in the brackish sand, had amazingly large flowers (sepals up to 9 mm. long) but *Viola primulifolia*, wandering in from the acid areas, was fruiting though its leaves were less than 1 cm. in length. *Juncus Greenei*, the commonest species on Cape Cod, and formerly known eastward only to Mt. Desert Island, was abundant with *Carex silicea*.

Returning to Barrington on Monday, the 9th, we drove eastward to Clement Pond. Three weeks earlier this pond had been most attractive from the train, with a well exposed beach, but now, after weeks of wet weather the beach was deeply submerged and travel was difficult. At the southeast corner of the pond (just why this large body of fresh water should be called a *pond*, while thousands of others like it are *lakes* we were unable to make out) the shore is a quaking bog, with characteristic growth of *Woodwardia virginica* and *Decodon verticillatus*, var. *laevigatus*, T. & G.<sup>2</sup>, the latter heretofore unknown east of the lower Penobscot. In the drier *Polytrichum*-covered border of this bog *Carex albolutescens*, var. *cumulata* and *C. bullata*, var. *Greenei* were abundant and, in many areas, *Corema Conradii*.

<sup>1</sup> See Fernald, RHODORA, xv. 72 (1913).

<sup>2</sup> See RHODORA, xix. 154 (1917).

The bottom of the lake had a fine development of *Subularia aquatica* but the most amazing sight of the day was the acres and acres of the southern *Solidago Elliottii*, forming solid thickets nearly 2 m. high in the spruce and red maple (often *Acer rubrum*, var. *tridens*) swamp. It was, indeed, a strange experience and one we should hardly expect even in the southern coastal plain, to break our way through the tall stems of this southern goldenrod, much as we had sometimes done on Maine bottomlands through the 'overtopping masses of Ostrich Fern. When reporting the seeming absence (p. 143) of the characteristically Canadian goldenrod, *Solidago canadensis*, from much of southwestern Nova Scotia, reference was made to an immature plant which there takes its place. This, needless to say, is *S. Elliottii*, which from mid-August through September colors the spruce swamps and boggy clearings. Occasionally, too, in the Barrington swamp there were clumps of *Solidago rugosa*, var. *sphagnophila*, described from southeastern Connecticut, but now known to be common in southeastern Massachusetts and south to New Jersey.

The next morning, most happily, brought Dr. and Mrs. Graves and with them the news that, although he had been unable to get passage on the boat with them, Bissell would be back next morning; and after getting the presses in order, we started out for a short afternoon walk, Long and Linder going to Sand Beach where they got *Polygonum allocarpum* Blake,<sup>1</sup> and found that the *Elymus virginicus* of the barrier beach was all var. *hirsutiglumis*. Dr. and Mrs. Graves and I followed the railroad southeast beyond Yarmouth, getting into such masses of *Habenaria psycodes* as we had never imagined, thousands of brilliant plumes almost crowding each other in the boggy swales. *Botrychium dissectum* and var. *obliquum* were very abundant and here, as elsewhere in Nova Scotia and the eastern states, show such a connecting series as clearly to indicate that they are mere forms of the same plant, and since the name *B. dissectum* Spreng. has priority of six years over *B. obliquum* Muhl. it is necessary to call the latter *B. dissectum*, forma *obliquum*.<sup>2</sup> *Sieglingia* abounded

<sup>1</sup> RHODORA, xix. 234 (1917).

<sup>2</sup> BOTRYCHIUM DISSECTUM Spreng., forma **obliquum** (Muhl.), n. comb. *B. obliquum* Muhl. in Willd., Sp. Pl. v. 63 (1810.)

in the dryish swales and we strongly felt that it here *looked* indigenous; and the most abundant rush of these swales was a plant entirely sterile and afterward seen in similar profusion south to Argyle and north to Digby Neck. Everywhere the plant fails to set fruit and the best we can do with it is to suppose it a hybrid of *J. articulatus* and *J. brevicaudatus*, both of which abound in the region.

(To be continued.)

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